

Networking :-

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What is Network? group of interconnected nodes

~~entity~~ \Rightarrow Interconnected group of different entities like person, computers, radio stations, etc.

1)

Network types classification?

Classified based on the area of distribution

of the network area of network

1) $\text{Personal Area Network (PAN)} = \text{LAN}$, $10\text{ km} = \text{MAN}$

($100\text{ m} - 1000\text{ m} = \text{WAN}$, $10,000\text{ km} = \text{planet (GAN)}$)

\Rightarrow sensor areas \Rightarrow residential \Rightarrow office

2) types of networks.

\Rightarrow PAN \Rightarrow Bluetooth

\Rightarrow LAN \Rightarrow office or factory, Printers, fax machines

\Rightarrow MAN \Rightarrow cable connections

\Rightarrow WAN \Rightarrow Internet

\Rightarrow GAN \Rightarrow globe using Satellites

3) LAN \Rightarrow Local Area Network \Rightarrow Wired LAN

\Rightarrow connect computers/laptops enabling to share resources

\Rightarrow (Wired LAN) (2) Wireless LAN

LAN = enterprise networks

wired is difficult in installation.

\Rightarrow $\text{Fiber} \Rightarrow \text{cable} \Rightarrow \text{LAN} \Rightarrow \text{F}$

4) VPN \Rightarrow Virtual Private Network \Rightarrow $\text{WAN} \Rightarrow \text{SNT}$

\Rightarrow it is a Private LAN \Rightarrow SNT

\Rightarrow creates secured tunnel b/w different networks using public network.

Using VPN Client \Rightarrow connects to the organization network from anywhere

\Rightarrow cable broadband

Q5) Advantages of Using VPN

- Connects different geographical locations
 - more cheap than WAN
 - VPN encrypts the Internet, Secures online identity
 - secured transactions and data transfer
- not intended for over the broad based

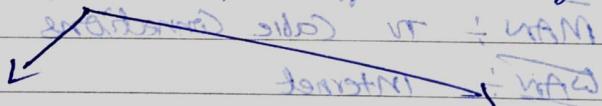
6. different types of VPNi) Access VPN

(VAN) ISDN = Integrated Services Digital Network

low-cost solution & provides wide range of connectivity

ii) Site-to-Site VPN

commonly used in large companies

iii) Intranet VPNiv) Extranet VPN

→ Connecting remote offices in different geographical locations have same accessibility policies

→ Extranet VPN is used for Suppliers, Customers, Partner, and other entities.

7. What are nodes & links?

Note: Communication devices (appliance)

link = link or edge of type of connectivity

wireless or wired or wireless

• motion sensor, PIR, motion

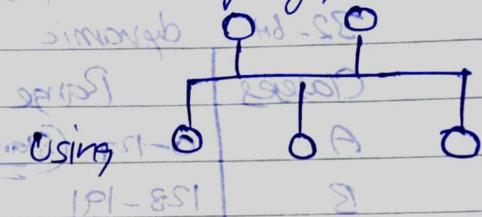
8) Networks Topology

Physical layout of the network connecting different nodes.

Q. Different types of network topology? (1)

Bus Topology

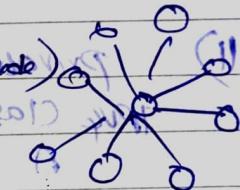
All nodes are connected using
single central link.



- * Useful for smaller no. of devices
- * Maintenance cable get damaged if will damage whole network.

Star Topology:

All connected to single node (Central Node).



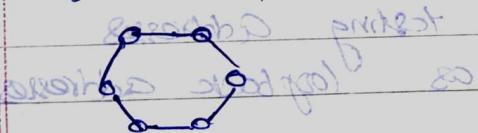
More robust

Easy to troubleshoot

Central node fails, complete network get damaged

Used in home & office networks

Ring Topology



Each node connected to two nodes

→ damages whole damaged

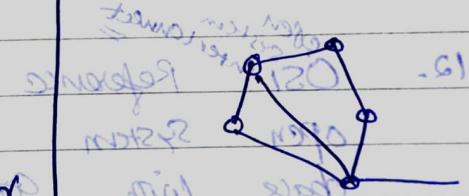
→ expensive, hard to install

→ rarely used

MESH Topology

Many nodes

→ robust to failures



Management is difficult

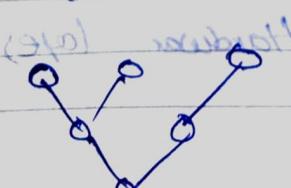
* Tree: (Bus + Star) topology

Main fails, all fails

Smaller network connected

to 120 Single bus

also known as extended bus



Hybrid

Combination of different topologies.

Ignoring

The drawbacks of particular topology.

Picking

(1) What is IPv4 different classes?

32-bit dynamic address 255.255.255.255

Classes	Range	Usage
A	0-127 (Starting point)	Large networks
B	128-191	Medium size networks
C	192-223	Used for LAN
D	224-239	for Multicasting
E	240-255	Study & Reserved

→ 127.0.0.1 is reserved for loopback

(2) Private addresses (non-routable) of

IPv4 Class	Start	End
A	10.0.0.0	10.255.255.255
B	172.16.0.0	172.31.255.255
C	192.168.0.0	192.168.255.255

(3) Special IP address : 127.0.0.1 to 127.255.255

Used for local network testing addresses

Also known as loopback addresses

12. OSI Reference Model

open system interconnect
Interconnection (OSI)
works with connecting the systems that
are communicating

(4). 7 diff layer.

Application) protocol (HTTP + TCP) ; SSL or
Presentation }

Session) signature ; session ; NCP
Transport) connection oriented ; reliable

Network) sublayer of LLC ; connectionless ; QoS

Physical) Hardware layer

Physical

Physical

Bit exchange

Bit Synchronization,

→ Hubs, cables

→ PPP, MAC protocol

Works without distinction

Network

Rating & logical Addressing

Routers (Devices)

IP ARP, ICMP, IPsec, OSPF, EIGRP

Path determination, forwarding

logical addressing

DATA LINK

Framing, physical addressing

Error, flow, access control

Switches

ARP, ICMP, EIGRP, OSPF, IPsec

detects Collision NO

Transport

Segmentation, Flow Control

Error Control

→ Firewalls

→ TCP, UDP

Session

Dialog Control

Session establishment

Maintenance

Established (Session)

(HTTPS, DNS, DHCP, Telnet, SMTP, POP)

Presentation

Network translation

Encryption/Decryption

Compression

into generic format

DHCP, Telnet, SMTP, POP

Application

Network Virtual Terminal

File Services, FTTaccess

HTTP, Firewall

(DHCP)

(4)

Describe TCP/IP Reference Model

4-layers ; developed by USI 2 protocols TCP/IP

Protocol ENT P X.25, ATM, Frame Relay, SDH, SONET

Application HTTP, SMTP, RTP, DNS + higher level Protocols

layers

Transport

TCP

UDP

Same as OSI

(Network)

Internet

IP

IP

ICMP

ICMP

(Data architecture)

Internet

Protocol

Protocol

(delivers IP packets)

Protocol

Protocol

Protocol

(decides which link

Protocol

Protocol

Protocol

connection goes)

Protocol

Protocol

Protocol

(Protocol)

Physical, Session, Presentation

relatives but now will add

some younger

generation

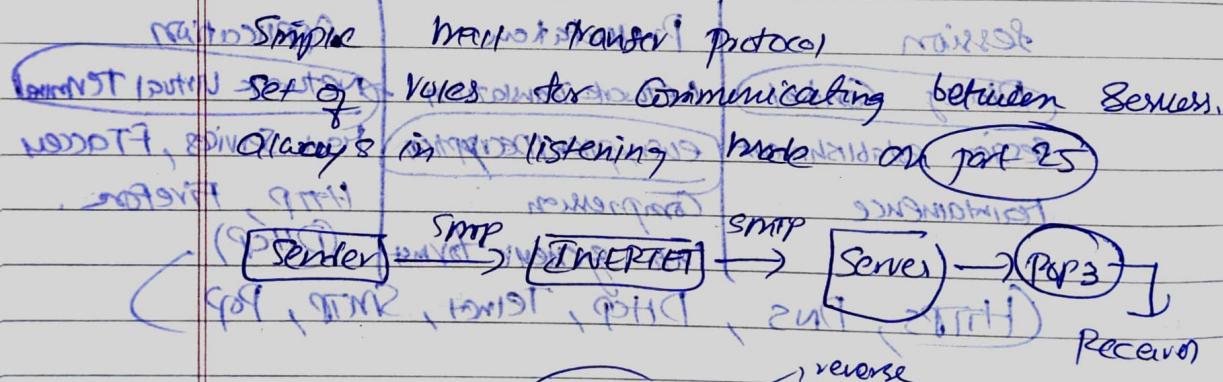
17. ~~HTTP~~

- (parallel) HyperText Transfer Protocol
- (proto) port 80
- set of rules on how the data can be transmitted on a network.
- Stateless protocol
- (port no. 80) → Cache command is independent of another application layer protocol.
- Port 80

~~HTTPs~~ ~~WWW~~

- HyperText Transfer Protocol Secure.
- Secured version of HTTP
- SSL/TLS Protocol is used.
- identifies network servers securely.
- (Port no. 443) → default port

18. SMTP Protocol?



19) DNS?

- Domain Name System:
- Service directory of the Internet
- Decentralized & hierarchical naming system

Port 53

• County generic - .gov, .org, .info, .edu, .com

20)

Use of Router

• How it is different from a gateway?

It is a networking device connecting two or more devices. It directs the traffic.

Transfer into nice JPU..mlv, emails in the frontlayer packets.

Gateway sends data between two dissimilar networks.

SYN, SYN+ACK, ACK

Date / /

Req - Response

23)

TCP/IP protocol

si UDPW (F)

→ Connection-oriented

Connectionless Protocol

→ More Reliable

→ less reliable

→ Slower Transmission

→ Fast Transmission

→ Packet order can be preserved

→ Packet order is not fixed

→ 3-way handshakes

→ no handshakes

→ heavy weight

→ light-weight

→ offers error checking

→ no error checking

→ HTTP, FTP, SMTP,

→ DNS, BOOTP, RIP, TFTP, etc

HTTPSD working

http://www.google.com

si initial babbles si si ←

24. What is ICMP protocol?

Internet message control message protocol in network layer.

→ for diagnosing the network connection

Port 7

service SAM

F3

Protocol number

ICMP access control

→ TCPDNP → dynamic host configuration protocol

auto configures devices on IP networks

enables them to use TCP & UDP-based

protocols.

auto-assigns IP's

or

helps in subnet mask

Port NO 67

3. Routing protocol and its brief

25. What is ARP Protocol?

ARP Address resolution protocol

Used to convert logical address

IP address → MAC address.

(Logical address)

(Physical address)

27) What is FTP Protocol? (8 Pts)

Ans: FTP is a file transfer protocol used to transfer files and data reliably. And efficiently between hosts. It can download files remotely.

Ans: MAC address is also known as physical address.

MAC address is media access control address.

- Also called physical address
- It is embedded with NIC card at Data Link layer.

NIC is a hardware component which facilitates device connection to a network.

29. MAC address

Media access Control

IP address

Internet Protocol

Ans: MAC address is obtained from network and physical address is logical address.

30) What is Subnet? Explain it.

Subnet is a network inside network achieved by the process of networking.

- Used for higher routing efficiency.
- Enhances the security of the network.
- It reduces the wait time to find the host address from the routing table.

(Routing table)

(Network diagram)

4. Subnets.

31) Hub :- work at physical layer

→ physical layer

→ Half-Duplex

→ Ethernet devices

→ less intelligent

→ Cheaper

→ less speed

→ no software support

→ less efficient

Avoid collisions

Switch :-

Data-link Layer

FULL-DUPLEX

CAN Devices

Intelligent

Costlier

High speed Gbps

Software Support

More efficient

(Collision can be avoided)

QoS

at 20 st things

32) IP Config :-

→ Internet Protocol Configuration

→ Command used in LAN

Micrososoft operating system Linux, Unix

Used to get the TCP/IP Summary & allows

for changes the DHCP and DNS Settings.

Windows 7

33) What is Firewall?

It is a network system security that is used to

monitor the incoming & outgoing traffic, i.e. blocks the

same. It maintains policies

Address layer Security at Network

It is either Software or hardware or both

Wall between Public, Private networking devices

34) What are unicasting?

Unicasting :- Sending message from source to

a single node called unicasting. (One-one)

b) Broadcast :- (One-all) transmitting data from

one host to many

c) Multi-cast :- (One-many)

→ Particular group of host

→ Video streaming

→ Email

Any casting allows to share the same IP address for multiple devices.
Used in Content delivery networks (CDN)
Or Domain name system (DNS) server

35)

what happens if google.com?

→ browser asks

1) Browser checks cache for URL

2) if not, browser checks if URL is present in the cache.

Request to OS to DNS lookup using UDP

and gets the IP address from DNS server

routing path established TCP connection

3) TCP connection (3-way handshake)

4) HTTP request to web server using TCP connection

5) Send response to browser

6) Close TCP connection before processing http response

7) Browser caches

8) Browser decodes the response

at browser using metal structure

9) Decoding problem submarine optical fiber

After cables bent-around world

enough to reverse path around 100 times.

10) Re-encoding (B) output into (A)

11) Intermediate stage, output needed (B)

3. Network etc today (H)

at some point latency increase is problem

(100ms) problem below slow since so many step forward (100ms) is bottleneck

around 10 ms each

(100ms) : 100-100 ms

from to work plant

finest 2nd

100 ms problem